Gas Recovery Solutions

“Aurora Eco-System” Technology

To Prevent Methane Emissions from
Pneumatic Well Site Equipment

&

To Monetize Recovered Natural Gas

www.gasrecoverysolutions.com
Market Need: What Oil & Gas Industry Challenges Do We Solve?

» Today, raw produced gas (un-combusted) is often used to drive pneumatic equipment at well sites, such as glycol pumps, controllers, valves, switches and plunger lifts—a.k.a. “instrument air”
  - Especially in cold climates—Marcellus/Utica; Rockies; Williston; Midcontinent and Canadian basins
  - Any well site using these devices will vent or flare the same amount of gas—regardless of the amount produced

» This is now under threat from new, stricter government regulations to reduce “fugitive” methane emissions—BLM, EPA, States and Canadian regulators
  - Use of produced gas as “instrument air” means that methane must be vented or flared
  - Many producers are not aware of this methane emissions source
  - Potentially significant fines or other regulatory consequences

» That produced gas cannot be sold to market ➔ Lost Revenues
  - ~ 50 MCF/day per well for instrument air = ~ $35,000/year of lost revenue per well @ $2/MCF
  - ~ $350,000/year for a 10-well pad—regardless of the amount of gas produced
  - Producers often greatly underestimate (by up to 10 X) the amount of gas used to drive their pneumatic devices

» VOCs are also often produced when using gas as instrument air—formaldehyde from glycol + flaring

» Untreated, “wet” gas corrodes equipment and freezes lines ➔ Equipment failure + repair costs
  - Can also cause valves and seals to degrade ➔ Exacerbates methane emissions
Our Solution: “Aurora Eco-System” for Instrument Air at Well Sites

» Aurora Eco-Systems provide clean, dry compressed air instead of using gas to drive pneumatic devices
  • Reduces or eliminates methane emissions at oil & gas wells (wet or dry gas)—avoids venting & flaring
  • Producers to sell & monetize gas that would otherwise be consumed as instrument air—“found revenues”
  • Avoids potential fines and other regulatory consequences

» Requires no changes to current well site operating procedures

» Commercially proven—60+ units deployed for large E&P cos.
  • USA, Canada & South America
  • In some of the world’s hottest & coldest climates

» Scalable, mobile and re-deployable

» Installation, training + O&M services provided (optional)

» Large Aurora units can serve 3-15 wells per unit (multi-well pads)

» Small Aurora units can serve 1 well each

» Payback periods 1-2 years—from recovered gas sold to market
  • Not including avoided fines of up to $500/day per well (BLM)
Aurora Eco-System Description—Patents Pending

» Does not require any changes to current well site operating procedures

» Compression system powered by an emissions-free solar and/or wind power generation system plus a battery pack for power storage—entirely off the grid
  • 24/7 operation

» Remotely monitored via satellite/cellular networks

» Entire system is contained in one shipping container—installed in one day
  • No special hook-ups/infrastructure required
  • Uses existing piping & tubing

» Mobile & scalable

» No power grid connection required

» No permits required

» Quad-0 compliant (EPA)

» Comprehensive warranty
Summary: Aurora Eco-System Benefits

**Economic**
- Improve net gas production and increase revenues by avoiding onsite consumption of gas
- Reduce CAPEX by avoiding premature equipment failure from exposure to corrosive “wet” gas
- Reduce OPEX (labor costs & downtime) associated with checking for leaks; repairs; replacements

**Environmental**
- Reduce methane emissions by reducing or eliminating methane venting, flaring and leaking
- Reduce VOC production & emissions from well site equipment
- Reduce NOx emissions by reducing or eliminating flaring

**Operations & Reliability**
- Improve reliability of equipment. Avoid premature failure from exposure to corrosive wet gas.
- Avoid freezing of equipment & lines from the use of wet gas (prone to freezing)
- Prevent additional methane emissions from corroded valves & seals

**Safety**
- Eliminating use of flammable natural gas as instrument air improves well site safety overall
GRS’s Financing & Revenue Sharing Program—“No Money Down”

Producers: You can purchase Aurora units from us OR partner with us

Background & Purpose

» Capital budgets are currently constrained for many E&P companies

» But the need to comply with new methane regulations + capture lost revenues is urgent

» GRS has developed a “no money down” financing & revenue sharing program to allow Aurora units to be deployed for E&P cos. without requiring a purchase or CAPEX

Program Overview

» GRS and its capital partners provide 100% of financing to deploy Aurora units

» GRS and the well owner/operator share revenues from the sale of natural gas that would otherwise be consumed onsite as instrument air

» Instrument air usage is measured in accordance with AGA standards & practices

» Operating charges & accounting protocols in accordance with Oil & Gas industry norms
### Sample Test Results: Aurora Eco-Systems at Green River Basin (WY) Gas Wells

<table>
<thead>
<tr>
<th>Well Information</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation: 6,770 feet</td>
<td>Total NG Flow (scfm) 118.7, NG Saving (scfd) 170,920, $513.32 (S/day)</td>
</tr>
<tr>
<td>Temperature: 32 °F</td>
<td>Methane 85%, 90%, 95% (lbs/day) 636.3, 6.738, 7.112</td>
</tr>
<tr>
<td>Number of Wells: 3</td>
<td>Ethane, Propane, &amp; Butane 0%, 5%, 10% (lbs/day) 0, 374, 749</td>
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<tr>
<td>Gage Pressure: 100 psi</td>
<td>CO₂ Flared (lbs/day) 21,946</td>
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<tr>
<td>Actual Gas Flow: 14.8 cfm</td>
<td>Natural Gas Weight: 0.0438 pcf (at 60 °F)</td>
</tr>
<tr>
<td>Natural Gas Cost: $2.93 per MMBtu</td>
<td>CO₂ (Flared NG): 128.4 lbs/Mcf</td>
</tr>
<tr>
<td>Act.Atm. Pressure: 11.44 psi</td>
<td>NG Cost: $3.00 per MMBtu</td>
</tr>
<tr>
<td>Std. Atm. Pressure: 14.696 psi (at 60 °F)</td>
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<table>
<thead>
<tr>
<th>Well Information</th>
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</thead>
<tbody>
<tr>
<td>Elevation: 7,000 feet</td>
<td>Total NG Flow (scfm) 75.5, NG Saving (scfd) 108,695, $291.90 (S/day)</td>
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<tr>
<td>Temperature: 55 °F</td>
<td>Methane 85%, 90%, 95% (lbs/day) 40.47, 4.285, 4.523</td>
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<td>Number of Wells: 3</td>
<td>Ethane, Propane, &amp; Butane 0%, 5%, 10% (lbs/day) 0, 238, 476</td>
</tr>
<tr>
<td>Gage Pressure: 100 psi</td>
<td>CO₂ Flared (lbs/day) 13,966</td>
</tr>
<tr>
<td>Actual Gas Flow: 9.861 cfm</td>
<td>Natural Gas Weight: 0.0438 pcf (at 60 °F)</td>
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<tr>
<td>Natural Gas Cost: $2.62 per MMBtu</td>
<td>CO₂ (Flared NG): 128.4 lbs/Mcf</td>
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<tr>
<td>Act.Atm. Pressure: 11.34 psi</td>
<td>NG Cost: $2.69 per Mcf</td>
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Gas well owners routinely underestimate the amount of gas consumed as instrument air. 35-60 Mcfd is typical ➞ Often 10% or more of a well’s produced gas.
Reduce methane emissions while increasing gas revenues!

Contact Information

To purchase Aurora Eco-Systems for your well sites or to discuss GRS’s 100% financing & revenue sharing program, please contact us at:

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